Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

We must take the positive sign with the radical.

Since $2l>a$, $\sqrt{(2a/l)}<2$, and the values of θ obtained from the last equation are real, but in order that θ be not greater than 90°, an obvious requirement in this problem, we must have $l<2a$. In any case, the position given by $\theta=0$ is unstable. The two values of θ given by the second equation give the positions of stable equilibrium when $2a>l>\frac{1}{2}a$.

Also solved by *G. B. M. ZERR.*

156. Proposed by W. J. GREENSTREET, A. M., Editor of The Mathematical Gazette, Stroud, Eng.

Three perfectly elastic particles start from the cusp of a smooth cycloid (axis vertical, vertex down) at intervals of t seconds. How long will it be to the nth collision?

Solution by G. B. M. ZERR, A. M., Ph.D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

Since the curve is a smooth cycloid and the particles perfectly elastic and of equal mass, whenever collision takes place the two particles that collide have the same velocity. The reaction of one upon the other from impact is the same as though one particle passed through the other without either being affected.

Let mt $(m>2)$ be the time it takes a particle to go from cusp to cusp, and a, the radius of the generating circle. Then $m=(2\pi/t)\sqrt{(a/g)}$. After the first particle has arrived at the opposite cusp, the second is t and the third $2t$ seconds behind it.

$\therefore$ Time to first collision is $mt+t/2=(2m+1)t/2$ seconds.
Time to second collision is $mt+t=(2m+2)t/2$ seconds.
Time to third collision is $mt+3t/2=(2m+3)t/2$ seconds.
Time to fourth collision is $mt+t+mt-t+t/2=(4m+1)t/2$ seconds.
Time of fifth collision is $(4m+2)t/2$ seconds.
Time of sixth collision is $(4m+3)t/2$ seconds; etc.

$\therefore$ The collisions take place in sets of three. The pth set is $(2pm+1)t/2$, $(2pm+2)t/2$, $(2pm+3)t/2$. If the nth collision is the 1st, 4th, 7th, ...$(3p-2)$th, then $n=3p-2$ or $p=(n+2)/3$, and it takes place in $[2(n+2)m+3]t/6$ seconds; if it is the 2nd, 5th, 8th, ...$(3p-1)$th, it takes place in $[2(n+1)m+6]t/6$ seconds; if it is the 3rd, 6th, 9th, ...$3p$th, it takes place in $(2nm+9)t/6$ seconds.

Also solved by *G. W. GREENWOOD.*

157. Proposed by T. W. WRIGHT, Professor of Mathematics, Schenectady, N. Y.

Explain why a waterfall h feet high can support a column $2h$ feet high.

Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

Let w=weight of a cubic foot of water. A column of water 1 foot square falling through h feet weighs hw pounds; to this must be added the kinetic energy of a cubic foot of water falling through h feet; this equals $wv^2/2g$, but $v^2=2gh$.

$\therefore$ kinetic energy$=wh$. $\therefore$ $wh+wh=2wh=w(2h)$.